

Dendrobium

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CROP PROFILE

SPECIES AND CULTIVARS

- *Dendrobium* is one of the largest genera of orchids, with about 900 species. It is distributed in Asia (e.g., Thailand, India, China, Malaysia, the Philippines, and Japan), New Guinea, Australia, and New Zealand.
- Brilliantly colored flowers are produced on sprays that grow out from the dendrobium plant. Flowers may be white, yellow, lavender, dark purple, or a combination of colors among the many species and hybrids.
- The Sonia cultivars account for over 70% of all dendrobium production in Thailand, the world's largest dendrobium producer and exporter. International trade in dendrobiums is based primarily on cut sprays.
- In Hawaii, the Uniwai cultivars account for over 70% of all plants grown for cut flower production. Most of Hawaii's dendrobiums bloom during summer and fall, and there are efforts to develop high-yielding, disease-resistant, and winter-blooming varieties.

PRODUCTIVITY

- Dendrobiums do not require land with soil because plants can grow in pots on benches. Crops are normally protected from the sun with shade houses. In Thailand, the planting density among commercial orchid producers is between 25,000 and 48,000 plants per acre, while in Hawaii it ranges from 20,000 to 35,000 plants per acre.
- Locations with temperatures between 60° and 85°F are suitable for dendrobium cultivation. Salt spray and high winds are undesirable. Under protected cultivation, it is estimated that 3000 to 4000 gallons of water are required per acre per day.
- From seed or tissue culture, dendrobium plants usually produce their first flowers within 18 months after they are removed from the flask. Commercial yields (full stem lengths) will begin the following season. In Hawaii, commercial growers do not use division as a means of propagation. In Thailand, however, single pseudostems with one vegetative bud are frequently used as propagation units, and the first flowers are produced in about 15 months.

Hawaii			Thailand, Singapore, and Malaysia		
Selected Cut Flower Cultivars	Color	Blooming Period	Selected Cut Flower Cultivars	Color	Blooming Period
<i>D. Jaq-Hawaii 'Pearl'</i> [†]	White	Summer-Fall	<i>D. Sonia 'Bom 17'</i>	White/Purple	Summer-Fall
<i>D. Jaquelyn Thomas 'Supreme'</i> [†]	White/Lavender	Summer-Fall	<i>D. Sonia 'Bom 28'</i>	White/Purple	Spring-Fall
<i>D. Jaquelyn Thomas 'Prince'</i> [†]	Dark Lavender	Summer-Fall	<i>D. Caesar</i>	White/Lavender	Sprg-Summer
<i>D. Jaquelyn Thomas 'Princess'</i> [†]	Light Lavender	Summer-Fall	<i>D. Walter Oumae</i>	White	Summer-Fall
<i>D. Jaquelyn Thomas 'Blush'</i> [†]	White/Pink tinge	Summer-Fall	<i>D. Madam Pompadour</i>	Purple	Fall-Winter
<i>D. Louis Bleriot</i>	Purple	Fall-Winter	<i>D. Waipahu Beauty</i>	Purple	Fall-Spring
<i>D. Betty Ho 'Kamiya'</i>	Yellow	Summer	<i>D. Ekapol Panda</i>	White/Purple	Fall-Spring
<i>D. Sonia 'Bom 17'</i>	White/Purple	Spring-Fall	<i>D. Ekapol Anna</i>	Purple	Fall-Spring
<i>D. Myron Mooney</i>	Near white	Fall-Spring	<i>D. Kasem Gold</i>	Yellow	Sprg-Summer
<i>D. Walter Oumae</i>	White	Summer-Fall	<i>D. Sabien</i>	Satin purple	Fall-Spring
[†] Uniwai cultivars					

- Good climate and proper management are essential for high yields. The Uniwai cultivars are similar in yield and generally provide 50 to 65 sprays per plant over the first five years of production. The yield of certain Thai cultivars may be only half that of the Uniwai cultivars, but some consider the sprays and flowers more spectacular.
- In Hawaii, dendrobiums are not replaced until after the fifth, sixth, or even seventh year of production, even though plant productivity may have declined after the third or fourth year. In Thailand, plants are replaced with young, more vigorous plants after only two or three years of production.
- The quality of cut sprays is determined in part by spray length, shelf life, and number of flowers. Longer, straight sprays are preferred, and a large number of open flowers relative to buds is desired.
- Factors determining shelf life include variety, storage temperature, humidity, and water quality. Packing flowers soon after harvesting and use of floral preservatives can extend shelf life.

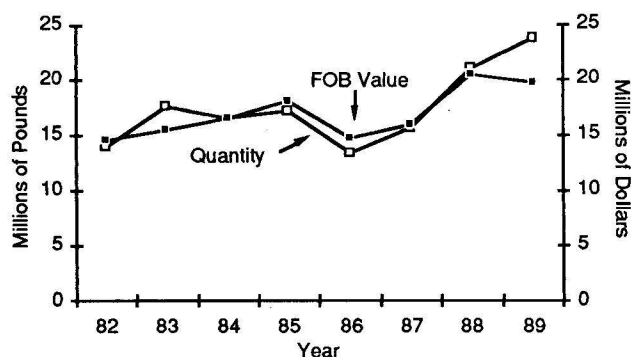
PRODUCTS AND USES

- Cut sprays are used as decoration for weddings, funerals, and other occasions. Customers are offered a wide variety of flower colors; because sprays readily soak up dyes, white flowers can also take on different colors. Sprays are typically sold in four sizes: extra long, long, medium, and short.
- Individual flowers are made into leis and are used by airlines and restaurants as ornaments on meal plates. Tropical drinks are also decorated with dendrobium flowers. Flowers can be freeze-dried to last longer. Preserved and coated flowers can be made into jewelry.

WORLD SUPPLY AND DEMAND

WORLD SUPPLY

- In 1988, orchids were produced on 5140 acres in Thailand. Of the orchids produced, over 70% were dendrobiums. Thailand's dendrobium industry has well-equipped tissue-culture labs and low-cost labor and materials. A few firms control a considerable portion of the market.
- Thailand exported 23.7 million lb of fresh cut orchids in 1989, a considerable increase from the



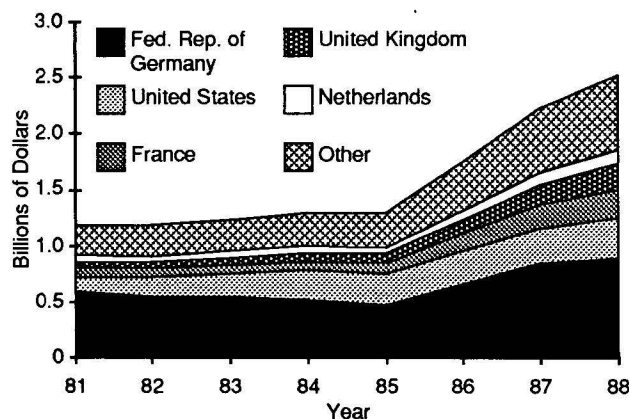
Thailand's exports of fresh cut orchids, 1982-89

13.9 million lb in 1982. The reported 1989 value of exports was \$19.7 million, most of which was dendrobium sprays. (Note: a conversion ratio used in Thailand is 1 lb = 12.7 orchid sprays.)

- Japan received more than 47% by volume of Thailand's fresh cut orchid exports in 1988. Other major markets for Thailand were Italy (13.1% of the total exports), the United States (7.8%), the Netherlands (6%), and the Federal Republic of Germany (5.7%).
- Singapore is another major exporter of dendrobiums. In 1989, Singapore exported more than \$8.5 million worth of fresh orchids, up 24.5% from the previous year. Japan was Singapore's largest market, accounting for 45% of the total value of exports, followed by Australia (17.6%) and Greece (5.1%). A significant portion of Singapore's exports is grown elsewhere.

WORLD DEMAND

- In 1988, world imports of cut flowers amounted to \$2.5 billion. The largest import markets were the Federal Republic of Germany (\$881.1 million), the United States (\$367.4 million), France (\$242.7



World imports of cut flowers, 1981-88

million), the United Kingdom (\$230.3 million), the Netherlands (\$130.7 million), Switzerland (\$127.4 million), and Japan (\$102.1 million).

- Japan is the world's leader in terms of per capita consumption of cut flowers based on dollar value. According to the 1990 Flower Council of Holland report, Japan's per capita consumption of cut flowers was about \$39, compared to \$35 for Switzerland, \$34 for the Netherlands, \$33 for Italy, and \$30 for the Federal Republic of Germany. Per capita consumption in the United States was around \$17.

SELECTED MARKETS

UNITED STATES

- In 1990, the CIF (cost, insurance, and freight) value of imported fresh cut flowers to the United States was more than \$391 million. Dendrobiums accounted for less than 1% of the total value of the imports.

U.S. imports of fresh cut flowers, 1990

Fresh cut flowers	CIF value (\$1000)
Roses, other	95,694
Carnations, standard	63,227
Chrysanthemums, pompom	62,043
Carnations, miniature	20,095
Chrysanthemums, other	9,596
Roses, sweetheart	3,863
Orchids, dendrobium	3,287
Orchids, other	2,565
Anthuriums	1,009
Other cut flowers and flower buds, fresh	130,605
Total	391,984

- The U.S. mainland market supply of fresh cut dendrobium sprays is provided by Hawaii and foreign imports. In 1989, most of Hawaii's 3.2 million out-of-state sales of dendrobium sprays were directed to the U.S. mainland. During the same year, the United States imported 5.6 million sprays from foreign countries.
- In 1990, the United States imported 9.1 million sprays of fresh dendrobium orchids at a CIF value of \$3.3 million. The quantity imported reflects an increase of 63.6% from the previous year. Thailand supplied more than 94.7% of the sprays imported in 1990. Other suppliers included Singapore (2.3%), Colombia (1.8%), and Peru (0.3%).
- The San Francisco wholesale price of dendrobiums from Hawaii ranged from \$1.20 to

\$2.00 for large sprays during 1988. Prices for small to medium sprays from Thailand ranged from \$0.75 to \$1.50 during the same year.

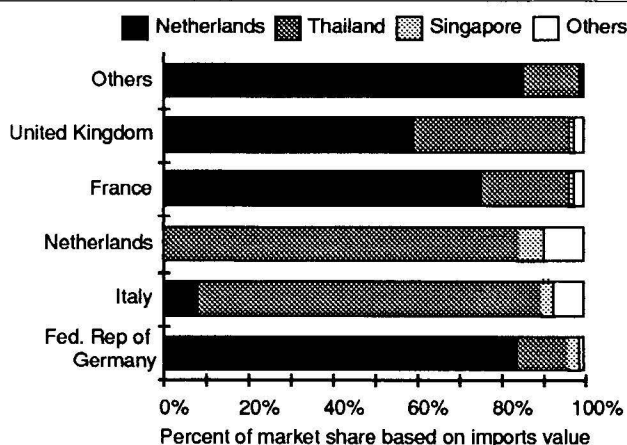
- U.S. mainland wholesale and retail buyers generally regard Hawaii dendrobium sprays as being of higher quality than the competition.

JAPAN

- In 1989, Japan imported \$110.5 million (¥15.2 billion) worth of cut flowers, an increase from \$16.7 million (¥4 billion) in 1983. The Netherlands supplied 37.4% of the total value of the 1989 imports, followed by Thailand (25.1%) and Taiwan (10.9%).
- Imported cut flowers from Thailand were primarily dendrobium orchids. Japan also produces some orchids domestically. The Netherlands supplied several varieties of flowers including freesias, nerines, lilies, and carnations. Cut flowers from Taiwan were mainly chrysanthemums.
- Imports of orchid pieces (includes sprays and individual flowers) to Japan increased more than 30-fold, from 2.5 million pieces in 1975 to 78.8 million pieces in 1986. Thailand supplied more than half of the 1986 total. Singapore and New Zealand were other suppliers for Japan.
- In Japan, imported cut flowers are typically channeled from the import trader to wholesale flower markets where they are auctioned to distributors (e.g., wholesalers for other prefectures, shippers) or retailers. There are approximately 342 wholesale markets and 25,000 retail flower shops in Japan.
- Demand for cut orchid flowers is seasonal and tied to special occasions such as graduation, school-entrance and company-entrance ceremonies, Respect for Aged Day, and weddings. One recent characteristic of Japan's cut flower market has been the sharp increase in purchases for gifts.

WESTERN EUROPE

- In 1988, the European Economic Community (EEC) imported 106 million pieces of orchids, valued at more than \$57.5 million. In terms of value, the Federal Republic of Germany was the major importer, accounting for 47.8% of the total value of imports. Other leading importers were Italy (22%), France (9.8%), the Netherlands (7.8%), and the United Kingdom (7.4%).

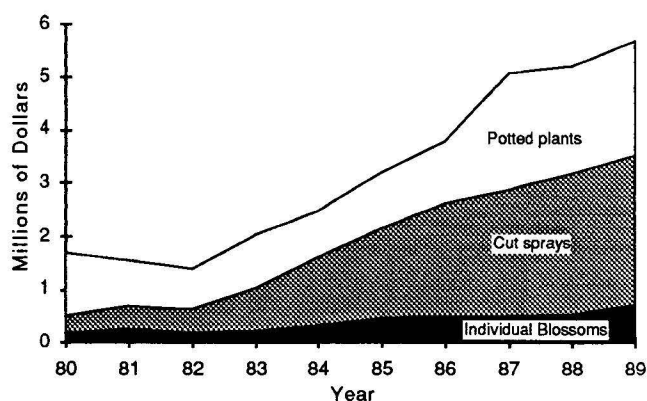


EEC orchid import market shares by supplier, 1988

- In the Federal Republic of Germany, the main types of orchids available are cymbidiums from European greenhouses and dendrobiums from Southeast Asian countries. The supply of dendrobiums peaks from August to December.
- Thailand is the major supplier of orchids to Italy and the Netherlands and accounted for more than 80% of the value of orchid imports for each country. Among the EEC countries, the Netherlands dominated the orchid import market. Much of this represents transshipments of orchids originating in Southeast Asia, however.

DENDROBIUM IN HAWAII

- Dendrobium sales accounted for 9.1% of the \$62.3 million floriculture industry in Hawaii during 1989. The combined 1989 sales of dendrobium cut sprays, individual flowers, and potted plants reached a record high of \$5.7 million, an increase from the \$1.7 million in 1980. Sales of cut sprays grew fastest, at an average annual rate of 26.6% from 1980 to 1989.
- In 1989, 5.2 million cut sprays were sold at a value of \$2.8 million. In addition, 455,000 pots and 24.9 million flowers were sold at values of \$2.2 million and \$709,000, respectively.
- The total area in dendrobium production during 1989 was 4.1 million square feet (94 acres), of which 3.1 million square feet were used for cut sprays and individual flowers, and 950,000



Hawaii dendrobium orchids sales, 1980-89

square feet for potted plants. Nearly half of the area in production was on the island of Oahu.

- Out-of-state sales of dendrobium cut sprays and potted plants increased from \$504,000 in 1980 to \$3.2 million in 1989. Cut sprays accounted for 69% of the sales in 1989. The 1989 average out-of-state sale prices for dendrobium sprays and potted plants were \$8.15/dozen and \$4.04/pot, respectively.
- The initial capital requirement (excluding land costs) for a 1.5-acre dendrobium farm in Hawaii was estimated at about \$185,000 for the first three years, according to a 1981 CTAHR study. According to a 1986 report by Kasetsart University of Thailand, a two-acre Thai farm would require approximately \$4300 over the same number of years and would have a net income of \$600/acre during the first year revenue was generated.
- Dendrobium production is labor intensive and largely unmechanized. Labor costs (manager and hired labor) can account for as much as 65% of the total operating expenses for an operation in Hawaii.
- The decline syndrome is a major problem for dendrobium producers in Hawaii. Other diseases are botrytis blights, cymbidium mosaic, leaf spot, root rot, and seedling damping. Some insects that affect dendrobium plants are aphids, mealybugs, orchid weevils, scale, and thrips.

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A list of references is available from the authors upon request.